
Douglasia conservatorum (Primulaceae), a New Species from Idaho and Montana, U.S.A.

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ABSTRACT. *Douglasia conservatorum* Björk is described as a new species from a single population in the Coeur d'Alene Mountains along the Idaho/Montana border in the United States. With other members of the genus, it shares a pink corolla color, branched and stellate trichomes, and pulvinate habit. Within *Douglasia* Lindl., it is unique in possessing papillae on the leaves, and additionally differs in its combination of traits of leaf shape, flower number, shape of the involucre bracts, and distribution and morphology of trichomes. Its morphology and range suggest that it is related to other temperate-climate *Douglasia* species, in contrast to all species in the northern, (sub)Arctic center of diversity. A key to *Douglasia* is presented. Like all other members of the genus, *D. conservatorum* is endemic to a small geographic range. The ecology and conservation priority of the species are discussed.

Key words: Coeur d'Alene Mountains, *Douglasia*, Idaho, IUCN Red List, Montana, Primulaceae.

Two regions are home to most of the diversity in the genus *Douglasia* Lindl. (Primulaceae): a northern center in the Beringian region of far northwestern North America and a southern center in the northwestern contiguous United States and adjacent southwestern Canada. The intervening latitudinal gap between these two centers of *Douglasia* species diversity corresponds to the extent of the ice sheets during the Last Glacial Maximum, where the genus is nearly absent, suggesting that species of *Douglasia* do not disperse rapidly into new geographic territory. Indeed, all of the species are regionally or narrowly endemic, restricted to small global ranges (Constance, 1938; Kelso, 1992). The southern center of *Douglasia* diversity includes five taxa, *D. idahoensis* Dougl. M. Hend., *D. laevigata* A. Gray var. *ciliata* Constance, *D. laevigata* var. *laevigata*, *D. montana* A. Gray, and *D. nivalis* Lindl.

Plants of a population of *Douglasia* found on Bloom Peak in the Coeur d'Alene Mountains on the Idaho/Montana border do not match the morphological identity of any of these five taxa, and are segregated from them by approximately 200 km. The plants also do not correspond to the morphologies of the Beringian species (*D. alaskana* (Coville & Standl. ex

Hultén) S. Kelso, *D. arctica* Hook., *D. beringensis* S. Kelso, Jurtzev & D. F. Murray, *D. gormanii* Constance, and *D. ochotensis* (Roem. & Schult.) Hultén) and are yet further separated from these geographically (Kelso, 2009). The morphological and geographic isolation of this population within *Douglasia* prompted investigation into the taxonomic validity of the plants as a new species.

***Douglasia conservatorum* Björk, sp. nov.** TYPE: U.S.A. Idaho: Shoshone Co., Coeur d'Alene Natl. Forest, Bitterroot Mtns., Bloom Peak on Idaho/Montana border, NE of Pritchard, T51N, R5E, NW Sect. 21, slope 70%, aspect N/NE, 5800 ft., subalpine forb community dominated by *Juncus* sp., 8 July 1997, A. Sondenaa 379 (holotype, ID). Figure 1.

Haec species a congeneris habitu suffruticoso, foliis viridibus papillosis atque pedunculo trichomatibus stellatis dense vestito flores plerumque 3 ad 6 gerente distinguitur.

A loosely pulvinate subshrub 5–20 cm wide, with a taproot topped by a branched caudex; leaf rosettes with 14 to 22 leaves. Leaves linear to narrowly elliptic, 7–16.5 × 1.3–2.6(–2.9) mm, fleshy but not distinctly succulent, margins sometimes obscurely (rarely distinctly) dentate in upper half, blades green and papillate on the margins and laminae; marginal papillae ca. 1.5–2× longer than wide, spinulose (Fig. 2). Peduncles 1 per leaf rosette, 12–30 mm tall, stellate-hairy throughout, the trichomes producing a grayish color; inflorescence terminal, umbelloid, 1 per scape, bearing broadly lanceolate to ovate or broadly elliptic bracts 2.7–5.1 × 1.1–3 mm, acute to obtuse at apex; pedicels (2)3 to 6(to 10), densely stellate, 3.5–8(–27) mm, each bearing a single bractless flower. Calyces sparsely to densely stellate- or branched-hairy, 5.5–9 × 3–6 mm (width measured across apex of connate portion in pressed material), with narrowly to broadly triangular teeth, 2.8–5 × 1–2.5 mm; corolla uniformly deep pink with yellow markings at the throat; corolla tube 10–11.5 mm long in total, with a limb 5.2–5.6 mm long; corolla lobes obovate to cuneate, often erose across the rounded, truncate, or (seldom) emarginate apex; corolla persistent after



Figure 1. —A. Habit of *Douglasia conservatorum* Björk showing the grayish stellate peduncles. —B. Corollas. —C. Habitat at the type locality of *D. conservatorum* showing the ridgeline habitat shortly above the snow cornices. Photos by the author.

shriveling, covering the globose fruits. Fruits dry prior to dehiscence, splitting open by 5 valves; seeds laterally flattened, medium reddish brown, with a pitted-reticular outer coat (Fig. 3).

Habitat and distribution. *Douglasia conservatorum* grows in open subalpine vegetation on well-drained gravelly soils derived from Precambrian siltite (Harrison et al., 2000). All plants occur along the length of a windblown ridge-crest. Its micro-distribution suggests that it is ecologically limited by duration or depth of snow accumulation. Snow blows from the ridge into cornices located slightly downslope to the leeward of the prevailing winds. No plants of *D. conservatorum* were located within this cornice zone, nor downslope on the windward side of the ridge, where snow accumulation is also very deep. Associ-

ated species include *Arabis nuttallii* (Kuntze) B. L. Rob., *Calochortus apiculatus* Baker, *Carex geyeri* Boott, *C. rossii* Boott in Hook., *Eremogone capillaris* (Poir.) Fenzl var. *americana* (Maguire) R. L. Hartm. & Rabeler, *Eriogonum flavum* Nutt. var. *piperi* (Greene) M. E. Jones, *Heuchera cylindrica* Douglas ex Hook., *Lomatium sandbergii* (J. M. Coult. & Rose) J. M. Coult. & Rose, *Polytrichum* Hedw., *Penstemon albertinus* Greene, and *Vaccinium oreophilum* Rydb.

Douglasia conservatorum is known only from the type locality, on Bloom Peak, on the Idaho/Montana border. Its narrow geographic range follows suit with other members of the genus, all of which are regional or narrow endemics of northwestern North America and Beringian Russia. Fruitless searches in 2003–2006 for *D. conservatorum* were undertaken on nearby peaks in the Coeur d’Alene Mountains. The late

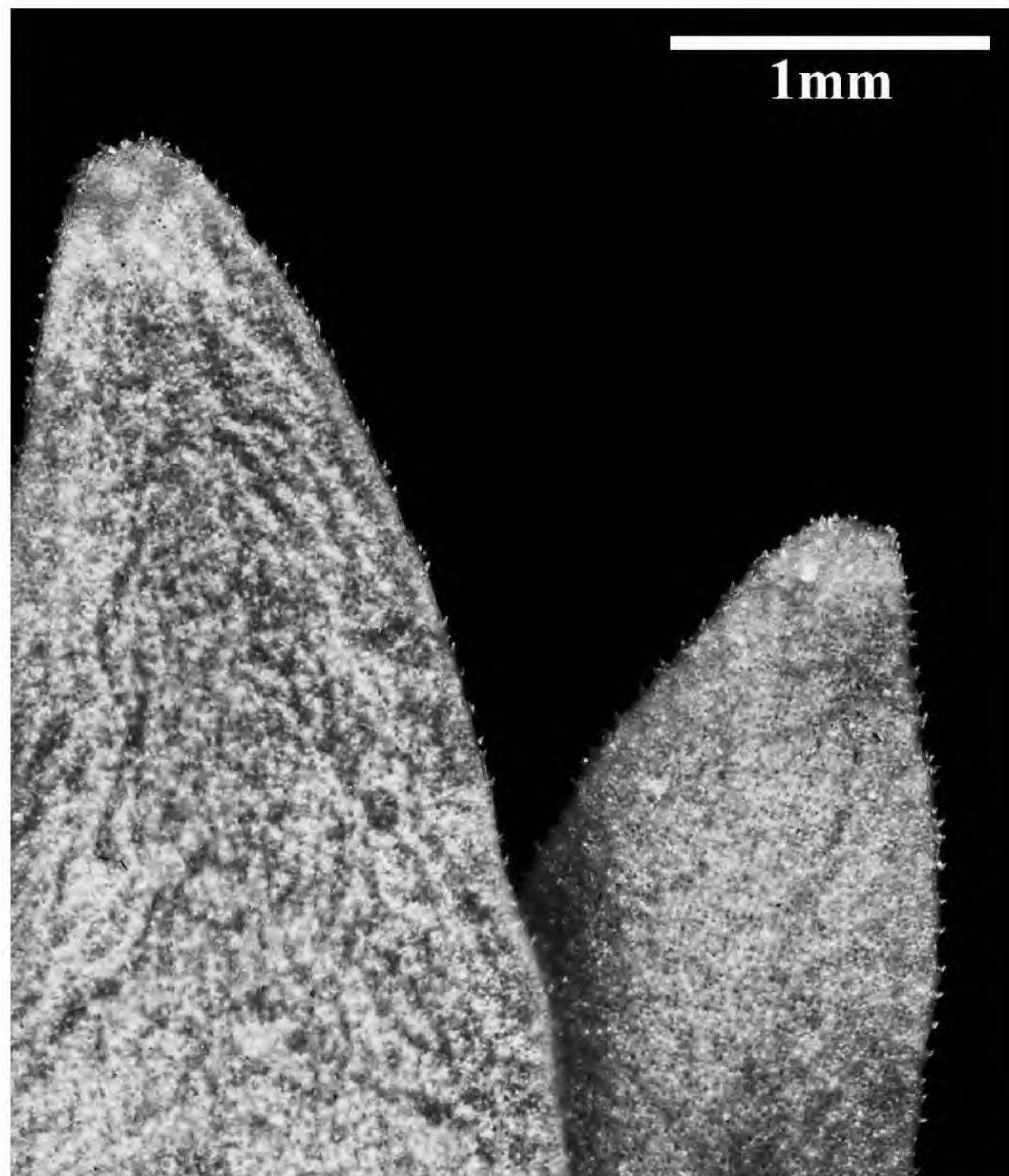


Figure 2. Distal portions of two leaves, showing the elongated papillae on the margins. Photo by Tim Wheeler.

summer timing of these searches would have been past the flowering period of the species, so any vegetative plants may have been overlooked. Few other peaks in the vicinity within the Coeur d'Alene Mountains are high enough to have extensive subalpine vegetation. Most other subalpine to alpine peaks in the region of northern Idaho and northwest Montana have been explored by botanists, as with the botanical survey of subalpine balds in the Coeur d'Alene Mountains (Moseley, 1996).

Conservation and IUCN Red List category. *Douglasia conservatorum* is thus likely to be a narrow endemic of great rarity. I estimate the Bloom Peak population to be only about 500 individual plants. In 2008, roughly 5% of the plants were run over by recreationists on all-terrain vehicles. Conservation measures should be taken immediately to ensure the continued existence of *D. conservatorum* in its wild population. The land is managed by the United States Forest Service, Kootenai National Forest (Montana), and Idaho Panhandle National Forests (Idaho), and a well-used recreation site is maintained within the population of *D. conservatorum*. Three plants were collected in 2008 to introduce the species into cultivation. These are now grown for propagation by Terry McIntosh, Vancouver, Canada.

According to IUCN Red List Categories and Criteria (IUCN, 2001), *Douglasia conservatorum* should be considered Critically Endangered (CR B2a) based on an area of occupancy $< 10 \text{ km}^2$ and being known to exist at only a single location.

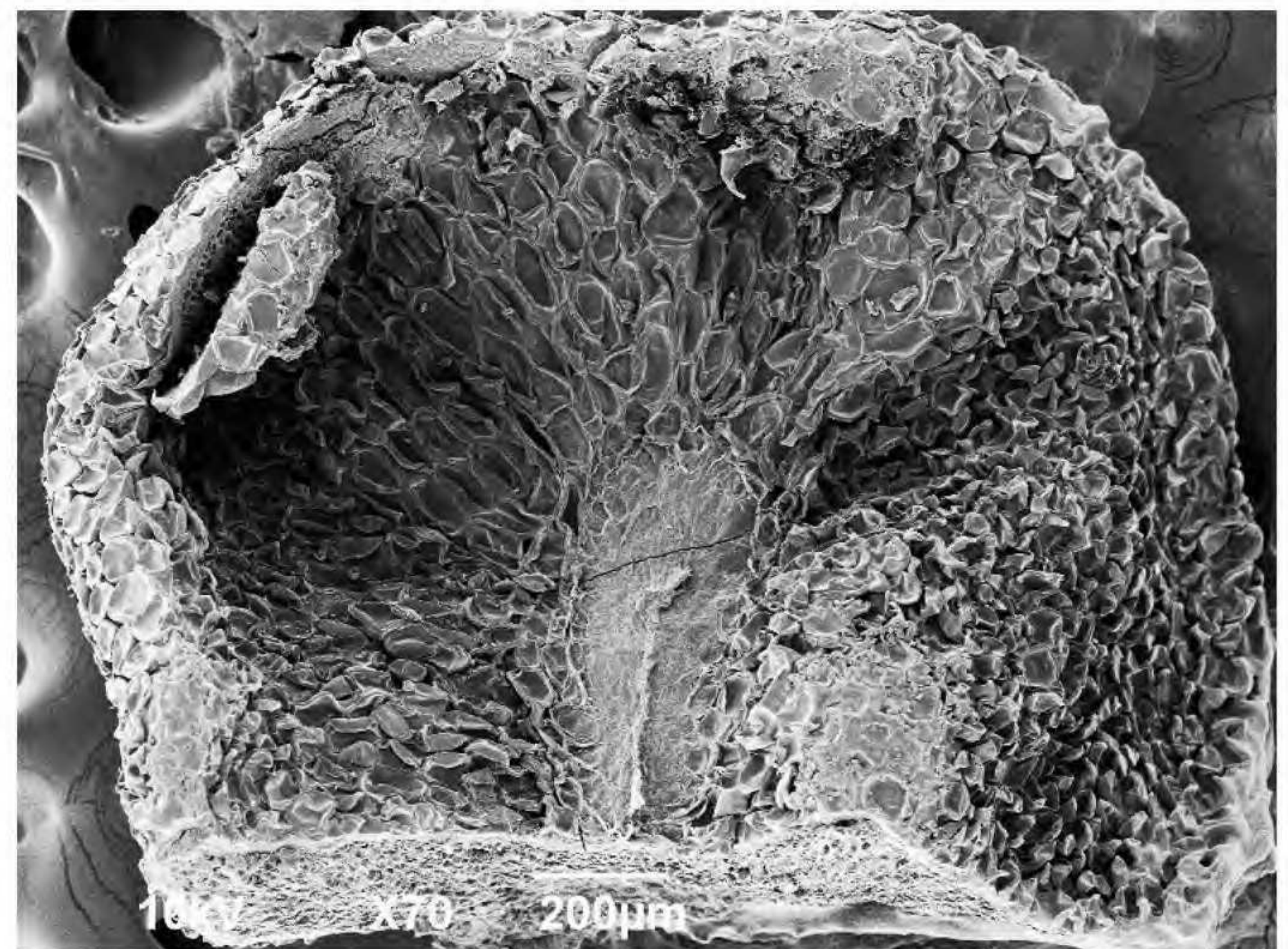


Figure 3. SEM image of a seed of *Douglasia conservatorum* Björk. Photo by Tass Kelso.

Etymology. The epithet *conservatorum* collectively honors all those who contribute time, funds, and efforts toward conservation of biodiversity and wild places. *Douglasia conservatorum* is a strikingly beautiful and rare plant, and one that I feel is particularly appropriate to name in thanks to the conservation community for their hard work and dedication.

Relationships. In having the combination of a subshrubby habit, green and papillate leaves, peduncles with dense stellate hairs, and usually three to six flowers, the Bloom Peak plants are distinct in morphology as compared to other known species in the genus. Some of their characteristics resemble those of *Douglasia laevigata*, which differs in having broader, obovate to oblanceolate leaves and a greater number of flowers per peduncle. *Douglasia idahoensis* differs in having simple or branched peduncle hairs, shorter peduncles (1–6 mm), narrowly lanceolate involucral bracts, and distinctly succulent leaves. *Douglasia montana* differs in having fewer involucral bracts and fewer flowers per peduncle, and usually is a more compact subshrub, forming rounded mounds. *Douglasia nivalis* is similar in leaf shape, but the leaves are grayish with dense stellate hairs. Additionally, the corollas of *D. nivalis* are generally purplish pink, and have darker markings adjacent to the yellow markings at the throat. The nearest known populations of other *Douglasia* species are those of *D. nivalis* 220 km west, *D. montana* 200 km to the east and southeast, and *D. idahoensis* 230 km south.

The precise systematic position of *Douglasia conservatorum* is beyond the topic of this paper, but the lack of marcescent leaves on the stems is shared with all other members of the temperate species, while marcescent leaves are found in all (sub)Arctic species except the anomalous species *D. alaskana* (Kelso, 2009). All of the characteristics of *D. conservatorum*

are found in various other combinations in other species, except that of the papillate leaves. The geographic isolation of this species probably prevents gene flow with other species in the genus. This, in combination with its morphological isolation, supports the recognition of the Bloom Peak population as a distinct species.

Paratype. U.S.A. **Idaho:** Shoshone Co., Bloom Peak on Idaho/Montana state line, 6 to 7 air mi. ENE from Shoshone Work Camp, Coeur d'Alene Natl. Forest, NW 1/4 of Sect. 21

T51N R5E, 25 June 1986, *F. D. Johnson & C. L. Johnson 1626* (ID).

The holotype was selected to be *Sondenaa 379* (ID), which demonstrates vegetative and reproductive characters. The specimen *F. D. Johnson 1626* (ID) includes plants in late flower and with immature fruits. I declined to collect new material sufficient for a type specimen due to the extreme rarity of the species. In the future, additional specimens will be obtained from cultivated plants.

KEY TO SPECIES OF *DOUGLASIA*

- 1a. Plants forming a single leaf rosette, not suffrutescent; pedicels several times longer than the peduncle at anthesis; (sub)Arctic. *D. alaskana*
- 1b. Plants with numerous leaf rosettes, pulvinate or suffrutescent; pedicels shorter than to about equal to the peduncle at anthesis; range various 2
 - 2a. Stems densely covered in marcescent leaves; (sub)Arctic species south to far northwestern British Columbia; (sub)Arctic species. 3
 - 3a. Leaf blades usually glabrous adaxially, margin hairs simple *D. arctica*
 - 3b. Leaf blades usually hairy adaxially, sometimes only at the apex, margin hairs simple, forked, or branched . . . 4
 - 4a. Leaves prominently recurved; blade with simple hairs *D. ochotensis*
 - 4b. Leaves not prominently recurved; blade with mostly forked or branched hairs. 5
 - 5a. Calyx and bracts glabrous *D. gormanii*
 - 5b. Calyx and bracts densely hairy, hairs branched and stellate *D. beringensis*
 - 2b. Stems lacking marcescent leaves; temperate species north to Haida Gwaii (Queen Charlotte Islands). 6
 - 6a. Flowers 1 or 2(3) per peduncle; involucre bracts (0)1 to 3; near or east of the Continental Divide in western North America *D. montana*
 - 6b. Flowers (2)3 to 7 per peduncle; involucre bracts 5 to 7; mostly west of the Continental Divide 7
 - 7a. Leaves grayish green throughout with dense stellate or branched hairs; corolla purplish pink, usually with dark markings near the throat. *D. nivalis*
 - 7b. Leaves green, glabrous or ciliate, with simple hairs; corolla deep pink, lacking purplish tones, lacking dark markings near the throat. 8
 - 8a. Peduncle hairs simple and branched; leaves to 2 mm wide, distinctly succulent; involucre bracts lanceolate to narrowly triangular, at least 2× longer than wide; central Idaho. *D. idahoensis*
 - 8b. Peduncle hairs branched and stellate; leaves at least 2 mm wide, not or scarcely succulent; involucre bracts ovate to broadly elliptic, up to 2× longer than wide; northern Idaho and Montana, or coastal regions 9
 - 9a. Leaves narrowly elliptic (width 1.3–2.6 mm), densely papillate; peduncles densely stellate, grayish green; Coeur d'Alene Mountains in Idaho and Montana *D. conservatorum*
 - 9b. Leaves oblanceolate to obovate (width 2–6 mm), smooth, not papillate; peduncles glabrate, not grayish; coastal regions, widespread in northwestern Oregon through coastal British Columbia *D. laevigatum*

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